PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Alan B. Caldwell et al.	Attorney Docket No. 9-13528-110US
Serial No: 09/642,108	Group Art Unit: 2616
Filed: August 21, 2000	Examiner: RAYMAN, Daniel J.

For: Method and Apparatus for Efficient Protocol-Independent Trunking of Data Signals

Commissioner for Patents
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Sir:

APPELLANT'S BRIEF UNDER 37 C.F.R. § 1.192

Pursuant to 37 C.F.R. § 1.191, the Applicant submitted a Notice of Appeal from the Examiner to the Board of Patent Appeals and Interferences on November 16, 2006. Specifically, the Applicant takes appeal from the Examiner's rejection of claims 1, 4-18, 20-41, 45-59, 61-82, 85-100 and 102-123 under 35 U.S.C. § 112. The Notice of Appeal was filed in response to the Examiner's Final Action mailed May 16, 2006 and Advisory Action mailed July 26, 2006. Pursuant to 37 C.F.R. § 1.192, the Applicant now submits the following brief.

1) Real Party in Interest

The real party of interest is Nortel Networks Limited, by virtue of an assignment executed by the inventors in favour of Nortel Networks Limited and recorded at Reel/Frame 011501/0386.

2) Related Appeals and Interferences

None.

3) Status of claims

Pursuant to the Final Action mailed May 16, 2006, the status of the claims is as follows:

- Claims 1, 4-18, 20-41, 45-59, 61-82, 85-100 and 102-123 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement.

The Examiner's rejections of claims 1, 4-18, 20-41, 45-59, 61-82, 85-100 and 102-123 are being appealed.

4) Status of Amendments

Applicant's Amendment After Final Action filed July 14, 2006, to the Final Office Action mailed May 16, 2006 included amendments in claims 1, 41, 67 and 82. The Advisory Action mailed July 26, 2006 indicated that the amendments overcame the 35 U.S.C. Sec. § 112 rejection, however, further search and/or consideration was required in order to make a proper patentability determination regarding the claims. Therefore, the amendments were not entered.

A Supplementary Response was filed on August 14, 2006 removing the amendments made to the claims in the Amendment After Final Action (which were not entered by the Examiner anyways). Further arguments to traverse the U.S.C. Sec § 112 rejection were provided. No action was issued by the Examiner in connection with the Supplementary Response before the expiry of the November 16, 2006 deadline.

A copy of the current claims is provided in the Appendix below.

5) Summary of Claimed Subject Matter

The present invention is directed to method, apparatus and systems for universal, protocol independent extension of legacy data services across a broadband packet network by transparently conveying data streams associated with such data services through the broadband

packet network. Claims 1, 41, 67 and 82 are independent claims defining features of the present invention.

Claim 1 defines a method of extending a data service of a legacy network [4a & 4b, Fig. 1 and page 14, lines 12-16] through a broadband packet network [6, Fig. 1 and page 14 line 27 to page 15 line 2], the method comprising steps of: at an ingress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24], accumulating payload data comprising a predetermined number of successive bytes of a data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] respecting the data service independently of a communications protocol of the data stream, the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] being a legacy data stream originating in the legacy network and received by the ingress gateway [8a or 8b, Fig. 1, page 14 lines 14-16 and page 15 lines 14-24] through the legacy network; encapsulating the payload data within a container [20, Fig. 2 and page 16 line 21 – page 17 line 6]; encapsulating the container within a protocol data unit (PDU) [24, Fig. 2 and page 17 lines 4 to 6] of the broadband packet network; and forwarding the PDU through the broadband packet network to an egress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24] irrespective of routing information contained within the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6].

Claim 41 defines an apparatus for extending a data service of a legacy network [4a & 4b, Fig. 1 and page 14, lines 12-16] through a broadband packet network [6, Fig. 1 and page 14 line 27 to page 15 line 2], the apparatus comprising means for accumulating payload data comprising a predetermined number of successive bytes of a data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] respecting the data service at an ingress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24], independently of a communications protocol of the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6], the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network; means for encapsulating the payload data within a container [20, Fig. 2 and page 16 line 21 – page 17 line 6]; means for encapsulating the container within a protocol data unit (PDU) [24, Fig. 2 and page 17 lines 4 to 6] of the broadband packet network; and means for forwarding the PDU

through the broadband packet network to an egress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24] irrespective of routing information contained within the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6].

Claim 67 defines an apparatus for extending a data service of a legacy network [4a & 4b, Fig. 1 and page 14, lines 12-16] through a broadband packet network [6, Fig. 1 and page 14 line 27 to page 15 line 2], the apparatus comprising means for receiving sequential PDUs [24, Fig. 2 and page 17 lines 4 to 6] of the broadband packet network at an egress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24] from an ingress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24]; means for extracting a respective container [20, Fig. 2 and page 16 line 21 – page 17 line 6] from each received PDU; and means for reconstructing a data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] respecting the data service using payload data contained within the respective containers, independently of a communications protocol of the data stream, the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network; and wherein the PDU is routed from the ingress gateway to the egress gateway irrespective of routing information contained within the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6].

Claim 82 defines a system for extending a data service of a legacy network [4a & 4b, Fig. 1 and page 14, lines 12-16] through a broadband packet network [6, Fig. 1 and page 14 line 27 to page 15 line 2], the system comprising an ingress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24] comprising means for accumulating payload data comprising a predetermined number of successive bytes of a data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] respecting the data service independently of communications protocol of the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6], the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network; means for encapsulating the payload data within a container [20, Fig. 2 and page 16 line 21 – page 17 line 6]; and means for encapsulating the container within a protocol data unit (PDU) [24, Fig. 2, and page 17 lines 4 to 6] of the broadband packet network; means for conveying the PDU through

the broadband packet network to an egress gateway [8a or 8b, Fig. 1 and page 14 lines 14-16 and page 15 lines 14-24] irrespective of routing information contained within the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6]; and the egress gateway comprising: means for extracting a respective container from each received PDU; and means for reconstructing the data stream [16, Fig. 2 and page 16 line 21 – page 17 line 6] using the respective containers.

6) Grounds of rejections to be Reviewed on Appeal

In the Final Action mailed May 16, 2006, the Examiner rejected claims 1, 4-18, 20-41, 45-59, 61-82, 85-100, and 102-123 under 35 U.S.C. § 112, first paragraph for failing to comply with the written description requirement. The Examiner stated that *"The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The independent claims, claims 1, 41, 67, 82, were amended to recite that the PDU is forwarded through the broadband network to an egress gateway "irrespective of routing information contained within the date stream.""*

The Examiner also stated that he *"...cannot find support for this limitation in the specification. In addition, fundamental principles of networking dictate that the information cannot be forwarded "irrespective of routing information contained within the date stream." The purpose of networking is to send information from a source to a destination. In order for information to arrive at the correct destination, the network would have to determine the destination from the data stream and then forward the stream accordingly."*

It was Applicant's understanding that based upon a telephone interview with the Examiner on July 7, 2006 an amendment to include the term 'legacy' to clarify antecedents of 'data stream' would address the Examiner's rejection. An Amendment After Final Action was filed July 14, 2006 with amendments to the independent claims to clarify the antecedents of the phrase 'data stream' as relating to the legacy data stream to aide the Examiner. In addition, Applicant provided references to the description to support use of the terms found in the claims.

Applicant believes that the amendments did not change the subject matter of the claims and were only submitted to further prosecution.

An Advisory Action was mailed July 26, 2006 in which the Examiner stated that *"The amendments to the claims overcome the 35 U.S.C. Sec. 112 rejection. However, further search and/or consideration is required in order to make a proper patentability determination regarding the claims. Therefore, the amendments will not be entered."*

In a subsequent telephone interview with the Examiner on August 14, 2006 Applicant expressed that the amendments did not change the subject matter of the claims and were made only to clarify antecedents in the claims only. As such, no further search and/or consideration should be required by the Examiner as the subject matter of the claims has not changed. The Examiner insisted that a further search was required. It was understood by Applicant that the Examiner would consider a Supplemental Response, without the claim amendments, if filed before the expiry of the final extended term of the Final Action to address the 35 U.S.C. Sec. 112 rejection. The Examiner stated that a subsequent Advisory Action or Allowance would be issued.

In an effort to expedite prosecution, a Supplemental Response was filed by Applicant on August 14, 2006 to traverse the 35 U.S.C. Sec. § 112 rejection, without the claim amendments made in the Amendment After Final Action submission.

No response from the Examiner was received by the November 16, 2006 deadline.

7) Argument

Rejections under 35 U.S.C. § 112, first paragraph

As best understood by Applicant, the Examiner's claim rejections in the Final Action are based on a misunderstanding of the antecedents in regards to the term 'data stream'. In raising the rejection under 35 USC § 112 the Examiner is misinterpreting the term *"irrespective of routing information contained within the data stream"* as referring to a data stream created

by the accumulation of PDU's, which on reading of the claims and the description is clearly not the case.

The present invention enables a universal (i.e. protocol-independent) extension of data services across a broadband packet network by transparently conveying data streams associated with such data services through the broadband packet network [page 14 lines 8 to 12]. Legacy data services are extended through the broadband network by establishing a connection between two gateways defining ingress and egress points. The gateways are attached to the respective legacy networks providing an efficient protocol-independent extension of data services from legacy networks through the broadband packet network transparently. Any routing information contained in the legacy stream is not relevant to forwarding the PDU through the broadband packet network as the legacy networks provide known end points at either end of the broadband network. The legacy protocol may be in the domains of the PSTN, enterprise site networks or physical connections to communications devices (e.g. a Plain Old Telephone Service [POTS] loop serving a telephone handset or legacy circuit-switched or packet-based communications protocols) [page 14 lines 18 to 24]. The legacy data stream may not have routing information that is relevant to the broadband network therefore the present invention is protocol-independent. The architecture and transport protocols of the broadband packet network are determined by provisioning, and thus are known in advance [page 15 lines 8-11]. The broadband network provides a means for extending legacy data services using a different network protocol [page 14 lines 17-24] transparently irrespective of the legacy data stream format or structure.

Support for the amendments to the claims that were submitted in the response filed April 11, 2006, in connection with the Non-Final Action mailed on January 11, 2006, is provided in various instances in the description. The amendment in question clarified that the PDU is forwarded through the broadband network to an egress gateway *"irrespective of routing information contained within the data stream"* to address rejections under 35 U.S.C. § 103. As stated on page 14, lines 14-27, of the detailed description *"...in FIG. 1, a pair of legacy networks 4a,4b are connected to a broadband packet network 6 via respective gateways 8a,8b. The legacy networks 4a, 4b may be, for example, respective domains of the*

PSTN, enterprise site networks, or physical connections to communications devices (e.g. a Plain Old Telephone Service [POTS] loop serving a telephone handset). Similarly, the legacy networks 4a,4b may operate in accordance with any legacy circuit-switched or packet-based communications protocol (e.g. E1, T1, SNA, video, FR, ISDN etc.). Each gateway 8 is coupled to its respective legacy network 4a,4b via one or more physical interfaces 10a,10b, conforming to the connection standard applicable to the legacy network 4". The trunk interconnection between the legacy networks is replaced by the broadband network and as stated on page 15, lines 14-23, *"... for a trunked connection through the broadband packet network 6 between originating and destination points 12a,12b, it is assumed that known methods are utilized to set up a connection between the originating point 12a and a first (i.e. ingress) gateway 8a. It is also assumed that known methods are used to set up a connection between the destination point 12b and a second (i.e. egress) gateway 8b, and to establish signalling between the two gateways 8a,8b through the broadband packet network 6".* The connection between the ingress gateway and egress gateway of the legacy networks are fixed and therefore routing information in the data stream is not relevant to routing of the PDU's as the source and destination are known gateways for the particular data service. There is no suggestion of using routing information contained in the legacy data stream to route the PDU data through the broadband network and would not be understood as such to a person of ordinary skill in the art.

It should be evident from the claims, and in particular the antecedents of the term 'the data stream', that the only data stream referred to in the claim is 'the legacy data stream'. The claim clearly states, for example in step a) claim 1, *"...accumulating payload data comprising a predetermined number of successive bytes of a data stream respecting the data service independently of a communications protocol of the data stream, the data stream being a legacy data stream originating in the legacy network..."* where in step d) states *"forwarding the PDU through the broadband packet network to an egress gateway irrespective of routing information contained within the data stream."* On reading the claim, and the remaining independent claims, the antecedents of the term 'data stream' is clear and should not cause confusion to a person of ordinary skill in the art as only one data stream is being referred to.

The term 'data stream' is consistently referring to as meaning the legacy data stream throughout the claims. It is unclear to Applicant how it can be interpreted otherwise.

The data stream from the legacy network is not processed and no information is extracted upon entering the broadband network, and this is what enables the Applicant's invention to be protocol-independent. It would be understood by a person of ordinary skill in the art that each of the legacy protocols may contain routing information but that it is not relevant to routing across the broadband network. For example, a data service such as circuit switched E1 or T1 data stream may contain multiple phone conversations or voice numbers to different destinations. This routing information is not relevant to enable the legacy data stream to traverse the broadband network. The data service is treated as a serial byte stream and the connection or data service as a whole is being transported across the network without regard to content. Therefore any forwarding of the PDU through the broadband network is irrespective of any information in the data stream of the data service, be it routing information or otherwise, as the connection across the broadband network is defined by the specific connection between the respective legacy networks. As stated on page 16, line 21 to page 17, line 6, *"the present invention provides protocol independent adaptation services between legacy data streams and protocol data units (PDUs) of the broadband packet network. This is accomplished by treating a legacy data stream received at the ingress server 8a as a serial byte stream. As shown in FIG. 2, the serial byte stream 16 is split into successive packets 18, which may be of arbitrary size. The packets are inserted into respective containers 20. Each container 20 includes a header portion 22 that conveys data usable by the egress gateway 8b for processing received containers 20 to regenerate the serial byte stream 16. In order to transport the containers 20 across the broadband packet network 6, each container is inserted into a respective protocol data unit(PDU) 24 of the broadband packet network in a conventional manner."* No processing or manipulation of the contents of the data stream occurs, nor is any routing information within the data stream relevant to routing the PDU's between the ingress and egress gateways. It should therefore be apparent that the forwarding of the PDU from the ingress gateway to the egress gateway occurs irrespective of the routing information contained

within the data stream which is clear from the description of the present invention. It is unclear to the Applicant how it could be interpreted otherwise.

Applicant submits that even without the minor clarifying amendment to the claims in regards to the antecedents of data stream, (as submitted in the Amendment After Final Action), the Examiner's rejections under 35 U.S.C. § 112, first paragraph has been traversed. The clarifying amendment (which was not entered, but was accepted by the Examiner as traversing the rejection under 35 U.S.C. § 112) did not change the structure of the claims or the nature of the claimed subject matter. The scope of the Examiner's initial search of the prior art should have sufficiently covered the field of the present invention even with a clarifying amendment to the term 'data stream'. The amendments made to the claims during prosecution should have not changed the scope of the prior art search performed by the Examiner. Further consideration of the claims should not be required of the claims at this stage in the prosecution. It is submitted that proper antecedents already existed for the term 'data stream' as the claims currently stand and that the subject matter of the claims comply with 35 U.S.C. § 112 and further expense on Applicant's behalf should not be required to provide the protection entitled.

In light of the foregoing, it is submitted that all of the elements of independent claims 1, 41, 67 and 82 are described and supported by the specification in compliance with 35 U.S.C. § 112. Reversal of the Examiner's rejection of claims 1, 4-18, 20-41, 45-59, 61-82, 85-100, and 102-123 under 35 U.S.C. § 112, first paragraph is therefore believed to be in order, and such action is courteously requested.

8) Appendix

Claims involved in the Appeal

1. [Previously Presented] A method of extending a data service of a legacy network through a broadband packet network, the method comprising steps of:

   a) at an ingress gateway, accumulating payload data comprising a predetermined number of successive bytes of a data stream respecting the data service independently of a communications protocol of the data stream, the data stream being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network;

   b) encapsulating the payload data within a container;

   c) encapsulating the container within a protocol data unit (PDU) of the broadband packet network; and

   d) forwarding the PDU through the broadband packet network to an egress gateway irrespective of routing information contained within the data stream.

2. [Cancelled]

3. [Cancelled]

4. [Previously Presented] A method as claimed in claim 1, wherein the communications protocol of the data stream is known.

5. [Previously Presented] A method as claimed in claim 4, wherein the predetermined number of bytes of the data stream forming the payload data is a function of the format of the data stream.

6. [Previously Presented] A method as claimed in claim 5, wherein the data stream is a circuit-switched data stream comprising pulse code modulated PCM signals, and the number of accumulated bytes forming the payload data is determined by a number of channels and number of multi-frames of the data stream.

7. [Previously Presented] A method as claimed in claim 6, wherein the number of accumulated bytes forming the payload data is equivalent to

$$Ps = (Nc \times Nm) \times n$$

Where: Ps = payload data size;

Nc = number of channels;

Nm = number of frames; and

n = an integer.

8. [Original] A method as claimed in claim 4, wherein the data stream is a packet data stream comprising sequential PDU's of a packet network protocol.

9. [Previously Presented] A method as claimed in claim 8, wherein the number of bytes forming the payload data is an integer multiple of a number of bytes forming each PDU of the packet network protocol.

10. [Previously Presented] A method as claimed in claim 1, wherein the communications protocol of the data stream is unknown.

11. [Previously Presented] A method as claimed in claim 1, wherein the step of accumulating payload data comprises steps of:

a) detecting an idle pattern; and

b) when an idle pattern is detected, discarding bytes of the data stream corresponding to the detected idle pattern.

12. [Original] A method as claimed in claim 11, wherein the idle pattern in known.

13. [Original] A method as claimed in claim 12, wherein the idle pattern is embedded within the data stream, and the step of detecting the idle pattern comprises a step of monitoring successively received bytes of the data stream to detect the idle pattern.

14. [Original] A method as claimed in claim 12, wherein idle pattern is indicative of an idle channel within the data stream, and the step of discarding bytes of the data stream comprises a step of discarding bytes within the indicated idle channel of the data stream.

15. [Original] A method as claimed in claim 12, wherein the idle pattern is a stimulus external to the data stream.

16. [Original] A method as claimed in claim 12, further comprising a step of forwarding an idle notification to the egress gateway, the idle notification comprising information identifying detected idle patterns and corresponding idle channels.

17. [Original] A method as claimed in claim 16, wherein the notification is forwarded within the container.

18. [Original] A method as claimed in claim 16, wherein the notification is forwarded within a notification message independently of the container.

19. [Cancelled]

20. [Previously Presented] A method as claimed in claim 11, wherein the step of detecting the idle pattern comprises a step of monitoring successive payload data to detect a repeating pattern indicative of an idle condition of the circuit-switched data stream.

21. [Previously Presented] A method as claimed in claim 20, wherein the step of discarding bytes of the circuit-switched data stream comprises a step of discarding successive payload data in which the repeating pattern is detected.

22. [Previously Presented] A method as claimed in claim 21, further comprising steps of:

a) interrupting the steps of encapsulating payload data within containers, encapsulating containers within PDUs and forwarding the PDUs to the egress gateway; and

b) sending an idle notification to the egress gateway.

23. [Previously Presented] A method as claimed in claim 22, further comprising steps of:

a) continuing to monitor successive payload data to detect the repeating pattern; and

b) resuming the steps of encapsulating payload data within containers, encapsulating containers within PDUs and forwarding PDUs to the egress gateway when the repeating pattern is no longer detected.

24. [Previously Presented] A method as claimed in claim 1, further comprising a step of inserting a sequence number into each successive container.

25. [Original] A method as claimed in claim 24, wherein at least one sequence number is a reserved sequence number used to indicate a start of the data stream.

26. [Original] A method as claimed in claim 1, further comprising steps of:

a) receiving sequential PDUs of the broadband packet network at the egress gateway from the ingress gateway;

b) extracting a respective container from each received PDU; and

c) reconstructing the data stream using the respective containers.

27. [Previously Presented] A method as claimed in claim 26, wherein the step of reconstructing the data stream comprises steps of:

a) buffering each container in a jitter buffer;

b) extracting a respective payload data from each container; and

c) appending extracted payload data to payload data of a previous container to reconstruct the data stream.

28. [Original] A method as claimed in claim 27, further comprising a step of sorting the buffered containers based on a respective sequence number of each container.

29. [Original] A method as claimed in claim 28, further comprising a step of monitoring the respective sequence numbers of each buffered container to detect a missing container.

30. [Previously Presented] A method as claimed in claim 29, further comprising, in respect of each detected missing container, a step of appending null payload data to previous payload data of the reconstructed data stream.

31. [Previously Presented] A method as claimed in claim 30, wherein the null payload data comprises AB-bits duplicated from previous payload data of the reconstructed data stream.

32. [Original] A method as claimed in claim 27, further comprising a step of

a) monitoring an inter-packet delay period between successively received PDU's; and

b) adjusting a length of the jitter buffer based on the inter-packet delay.

33. [Original] A method as claimed in claim 32, wherein the length of the jitter buffer is adjusted during an idle period of the data stream.

34. [Original] A method as claimed in claim 26, wherein the step of reconstructing the data stream further comprises a step of receiving an idle notification from the ingress gateway.

35. [Original] A method as claimed in claim 34, wherein the idle notification comprises information identifying one or more of an idle indication and a corresponding idle channel of the data stream received by the ingress gateway, and the step of reconstructing the data stream further comprises a step of inserting null data into the corresponding idle channel of the reconstructed data stream following receipt of the idle indication.

36. [Original] A method as claimed in claim 35, wherein the null data includes the idle indication.

37. [Previously Presented] A method as claimed in claim 34, wherein the idle notification comprises an indication of an idle condition of the data stream received by the ingress gateway, and the step of reconstructing the data stream comprises any one or more of duplicating last received payload data, and inserting a provisioned idle pattern.

38. [Original] A method as claimed in claim 34, wherein the notification is received by the egress gateway encapsulated within a container.

39. [Original] A method as claimed in claim 34, wherein the notification is received by the egress gateway within a notification message independently of a container.

40. [Original] A method as claimed in claim 34, further comprising a step of resuming reconstruction of the data stream based on containers extracted from received PDU's upon receipt of a container having a predetermined reserved sequence number.

41. [Previously Presented] An apparatus for extending a data service of a legacy network through a broadband packet network, the apparatus comprising:

a) means for accumulating payload data comprising a predetermined number of successive bytes of a data stream respecting the data service at an ingress gateway, independently of a communications protocol of the data stream, the data stream being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network;

b) means for encapsulating the payload data within a container;

c) means for encapsulating the container within a protocol data unit (PDU) of the broadband packet network; and

d) means for forwarding the PDU through the broadband packet network to an egress gateway irrespective of routing information contained within the data stream.

42. [Cancelled]

43. [Cancelled]

44. [Cancelled]

45. [Previously Presented] An apparatus as claimed in claim 41, wherein the communications protocol of the data stream is known.

46. [Original] An apparatus as claimed in claim 45, wherein the predetermined number of bytes of the data stream forming each payload packet is a function of the format of the data stream.

47. [Previously Presented] An apparatus as claimed in claim 46, wherein the data stream is a circuit-switched data stream comprising pulse code modulated (PCM) signals, and the number of accumulated bytes forming the payload data is determined by a number of channels and a number of multi-frames of the data stream.

48. [Previously Presented] An apparatus as claimed in claim 47, wherein the number of accumulated bytes forming the payload data is equivalent to

$$Ps = (Nc \times Nm) \times n$$

Where: Ps = payload data size;

Nc = number of channels;

Nm = number of frames; and

n = an integer.

49. [Original] An apparatus as claimed in claim 45, wherein the data stream is a packet data stream comprising sequential PDU's of a packet network protocol.

50. [Previously Presented] An apparatus as claimed in claim 49, wherein the number of bytes forming the payload data is an integer multiple of a number of bytes forming each PDU of the packet network protocol.

51. [Previously Presented] An apparatus as claimed in claim 41, wherein the communications protocol of the data stream is unknown.

52. [Previously Presented] An apparatus as claimed in claim 41, wherein the means for accumulating payload data comprises:

a) means for detecting an idle pattern; and

b) means responsive to detection of an idle pattern and adapted to discard bytes of the data stream corresponding to the detected idle pattern.

53. [Original] An apparatus as claimed in claim 52, wherein the idle pattern in known.

54. [Original] An apparatus as claimed in claim 53, wherein the idle pattern is embedded within the data stream, and the means for detecting the idle pattern comprises means for monitoring successively received bytes of the data stream to detect the idle pattern.

55. [Original] An apparatus as claimed in claim 53, wherein idle pattern is indicative of an idle channel within the data stream, and the means for discarding bytes of the data stream comprises means for discarding bytes within the indicated idle channel of the data stream.

56. [Original] An apparatus as claimed in claim 53, wherein the idle pattern is a stimulus external to the data stream.

57. [Original] An apparatus as claimed in claim 53, further comprising means for forwarding an idle notification to the egress gateway, the idle notification comprising information identifying detected flags and corresponding idle channels.

58. [Original] An apparatus as claimed in claim 57, wherein the notification is forwarded within the container.

59. [Original] An apparatus as claimed in claim 57, wherein the notification is forwarded within a notification message independently of the container.

60. [Cancelled]

61. [Previously Presented] An apparatus as claimed in claim 52, wherein the means for detecting the idle pattern comprises means for monitoring each successive payload data to detect a repeating pattern indicative of an idle condition of the circuit-switched data stream.

62. [Previously Presented] An apparatus as claimed in claim 61, wherein the means for discarding bytes of the circuit-switched data stream comprises means for discarding successive payload data in which the repeating pattern is detected.

63. [Previously Presented] An apparatus as claimed in claim 62, further comprising:

a) means for interrupting encapsulation of payload data within containers, encapsulating containers within PDUs and forwarding the PDUs to the egress gateway; and

b) means for sending an idle notification to the egress gateway.

64. [Previously Presented] An apparatus as claimed in claim 63, further comprising means for resuming the encapsulation of payload data within containers, encapsulation of containers within PDUs and forwarding of PDUs to the egress gateway when the repeating pattern is no longer detected.

65. [Previously Presented] An apparatus as claimed in claim 41, further comprising means for inserting a sequence number into each successive container.

66. [Original] An apparatus as claimed in claim 65, wherein at least one sequence number is a reserved sequence number used to indicate a start of the data stream.

67. [Previously Presented] An apparatus for extending a data service of a legacy network through a broadband packet network, the apparatus comprising:

a) means for receiving sequential PDUs of the broadband packet network at an egress gateway from an ingress gateway;

b) means for extracting a respective container from each received PDU; and

c) means for reconstructing a data stream respecting the data service using payload data contained within the respective containers, independently of a communications protocol of the data stream, the data stream being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network; and

wherein the PDU is routed from the ingress gateway to the egress gateway irrespective of routing information contained within the data stream.

68. [Previously Presented] An apparatus as claimed in claim 67, wherein the means for reconstructing the data stream comprises:

a) a jitter buffer adapted to buffer each container;

b) means for extracting respective payload data from each buffered container; and

c) means for appending each extracted payload data to payload data of a previous container to reconstruct the data stream.

69. [Original] An apparatus as claimed in claim 68, further comprising means for sorting the buffered containers based on a respective sequence number of each container.

70. [Original] An apparatus as claimed in claim 69, further comprising means for monitoring the respective sequence numbers of each buffered container to detect a missing container.

71. [Previously Presented] An apparatus as claimed in claim 70, further comprising, means for appending null payload data to previous payload data of the reconstructed data stream in respect of each detected missing container.

72. [Previously Presented] An apparatus as claimed in claim 71, wherein the null payload data comprises AB-bits duplicated from the previous payload data of the reconstructed data stream.

73. [Original] An apparatus as claimed in claim 68, further comprising:

a) means for monitoring an inter-packet delay period between successively received PDU's; and

b) means for adjusting a length of the jitter buffer based on the inter-packet delay.

74. [Original] An apparatus as claimed in claim 73, wherein the length of the jitter buffer is adjusted during an idle period of the data stream.

75. [Original] An apparatus as claimed in claim 67, wherein the means for reconstructing the data stream further comprises means for receiving an idle notification from the ingress gateway.

76. [Original] An apparatus as claimed in claim 75, wherein the idle notification comprises information identifying one or more of an idle indication and a corresponding idle channel of the data stream received by the ingress gateway, and the means for reconstructing the data stream further comprises means for inserting null data into the corresponding idle channel of the reconstructed data stream in response to receipt of the idle indication.

77. [Original] An apparatus as claimed in claim 76, wherein the null data includes the idle indication.

78. [Previously Presented] An apparatus as claimed in claim 75, wherein the idle notification comprises an indication of an idle condition of the data stream received by the ingress gateway, and the means for reconstructing the data stream comprises means for duplicating last received payload data in response to receipt of the idle notification.

79. [Original] An apparatus as claimed in claim 75, wherein the notification is received by the egress gateway encapsulated within a container.

80. [Original] An apparatus as claimed in claim 75, wherein the notification is received by the egress gateway within a notification message independently of a container.

81. [Original] An apparatus as claimed in claim 75, further comprising means for resuming reconstruction of the data stream based on containers extracted from received PDU's upon receipt of a container having a predetermined reserved sequence number.

82. [Previously Presented] A system for extending a data service of a legacy network through a broadband packet network, the system comprising:

a) an ingress gateway comprising:

i) means for accumulating payload data comprising a predetermined number of successive bytes of a data stream respecting the data service independently of communications protocol of the data stream, the data stream being a legacy data stream originating in the legacy network and received by the ingress gateway through the legacy network;

ii) means for encapsulating the payload data within a container; and

iii) means for encapsulating the container within a protocol data unit (PDU) of the broadband packet network;

b) means for conveying the PDU through the broadband packet network to an egress gateway irrespective of routing information contained within the data stream; and

c) the egress gateway comprising:

i) means for extracting a respective container from each received PDU; and

ii) means for reconstructing the data stream using the respective containers.

83. [Cancelled]

84. [Cancelled]

85. [Previously Presented] A system as claimed in claim 82, wherein the broadband packet network is based on any one or more of the UDP/IP, TCP/IP, IP-MPLS, ATM, Ethernet and DOCSIS protocols, and the data stream is based on any other communications protocol.

86. [Previously Presented] A system as claimed in claim 85, wherein the communications protocol of the data stream is known.

87. [Previously Presented] A system as claimed in claim 86, wherein the predetermined number of bytes of the data stream forming each payload data is a function of the format of the data stream.

88. [Previously Presented] A system as claimed in claim 87, wherein the data stream is a circuit-switched data stream comprising pulse code modulated (PCM) signals, and the number of accumulated bytes forming each payload data is determined by a number of channels and a number of multi-frames of the data stream.

89. [Previously Presented] A system as claimed in claim 88, wherein the number of accumulated bytes forming each payload data is equivalent to

$$Ps = (Nc \times Nm) \times n$$

Where: Ps = payload data size;

Nc = number of channels;

Nm = number of frames; and

n = an integer.

90. [Original] A system as claimed in claim 86, wherein the data stream is a packet data stream comprising sequential PDU's of a packet network protocol.

91. [Previously Presented] A system as claimed in claim 90, wherein the number of bytes forming each payload data is an integer multiple of a number of bytes forming each PDU of the packet network protocol.

92. [Previously Presented] A system as claimed in claim 85, wherein the communications protocol of the data stream is unknown.

93. [Previously Presented] A system as claimed in claim 82, wherein the means for accumulating payload data comprises:

a) means for detecting an idle pattern; and

b) means responsive to detection of an idle pattern and adapted to discard bytes of the data stream corresponding to the detected idle pattern.

94. [Original] A system as claimed in claim 93, wherein the idle pattern in known.

95. [Original] A system as claimed in claim 94, wherein the idle pattern is embedded within the data stream, and the means for detecting the idle pattern comprises means for monitoring successively received bytes of the data stream to detect the idle pattern.

96. [Original] A system as claimed in claim 94, wherein idle pattern is indicative of an idle channel within the data stream, and the means for discarding bytes of the data stream comprises means for discarding bytes within the indicated idle channel of the data stream.

97. [Original] A system as claimed in claim 94, wherein the idle pattern is a stimulus external to the data stream.

98. [Original] A system as claimed in claim 94, further comprising means for forwarding an idle notification to the egress gateway, the idle notification comprising information identifying detected flags and corresponding idle channels.

99. [Original] A system as claimed in claim 98, wherein the notification is forwarded within the container.

100. [Original] A system as claimed in claim 98, wherein the notification is forwarded within a notification message independently of the container.

101. [Cancelled]

102. [Previously Presented] A system as claimed in claim 93, wherein the means for detecting the idle pattern comprises means for monitoring each successive payload data to detect a repeating pattern indicative of an idle condition of the circuit-switched data stream.

103. [Previously Presented] A system as claimed in claim 102, wherein the step of discarding bytes of the circuit-switched data stream comprises a step of discarding successive payload data in which the repeating pattern is detected.

104. [Previously Presented] A system as claimed in claim 103, further comprising:

a) means for interrupting encapsulation of payload data within containers, encapsulating containers within PDUs and forwarding the PDUs to the egress gateway; and

b) means for sending an idle notification to the egress gateway.

105. [Previously Presented] A system as claimed in claim 104, further comprising:

a) means for continuing to monitor successive payload data to detect the repeating pattern; and

b) means for resuming the steps of encapsulating payload data within containers, encapsulating containers within PDUs and forwarding PDUs to the egress gateway when the repeating pattern is no longer detected.

106. [Previously Presented] A system as claimed in claim 82, further comprising means for inserting a sequence number into each successive container.

107. [Original] A system as claimed in claim 106, wherein at least one sequence number is a reserved sequence number used to indicate a start of the data stream.

108. [Previously Presented] A system as claimed in claim 82, wherein the means for reconstructing the data stream comprises steps of:

a) a jitter buffer adapted to buffer each container;

b) means for extracting respective payload data from each buffered container; and

c) means for appending extracted payload data to payload data of a previous container to reconstruct the data stream.

109. [Original] A system as claimed in claim 108, further comprising means for sorting the buffered containers based on a respective sequence number of each container.

110. [Original] A system as claimed in claim 109, further comprising means for monitoring the respective sequence numbers of each buffered container to detect a missing container.

111. [Previously Presented] A system as claimed in claim 110, further comprising means for appending null payload data to previous payload data of the reconstructed data stream in respect of each detected missing container.

112. [Previously Presented] A system as claimed in claim 111, wherein the null payload data comprises AB-bits duplicated from the previous payload data of the reconstructed data stream.

113. [Original] A system as claimed in claim 108, further comprising:

a) means for monitoring an inter-packet delay period between successively received PDU's; and

b) means for adjusting a length of the jitter buffer based on the inter-packet delay.

114. [Original] A system as claimed in claim 113, wherein the length of the jitter buffer is adjusted during an idle period of the data stream.

115. [Original] A system as claimed in claim 82, wherein the means for reconstructing the data stream further comprises means for receiving an idle notification from the ingress gateway.

116. [Original] A system as claimed in claim 115, wherein the idle notification comprises information identifying one or more of an idle indication and a corresponding idle channel of the data stream received by the ingress gateway, and the means for reconstructing the data stream further comprises means for inserting null data into the corresponding idle channel of the reconstructed data stream in response to receipt of the idle indication.

117. [Original] A system as claimed in claim 116, wherein the null data includes the idle indication.

118. [Previously Presented] A system as claimed in claim 115, wherein the idle notification comprises an indication of an idle condition of the data stream received by the ingress gateway, and the means for reconstructing the data stream comprises means for duplicating a last received payload data in response to receipt of the idle notification.

119. [Original] A system as claimed in claim 115, wherein the notification is received by the egress gateway encapsulated within a container.

120. [Original] A system as claimed in claim 115, wherein the notification is received by the egress gateway within a notification message independently of a container.

121. [Original] A system as claimed in claim 115, further comprising means for resuming reconstruction of the data stream based on containers extracted from received PDU's upon receipt of a container having a predetermined reserved sequence number.

122. [Previously Presented] A method as claimed in claim 1, wherein the broadband packet network is based on any one or more of the UDP/IP, TCP/IP, IP-MPLS, ATM, Ethernet and DOCSIS protocols, and the data stream is based on any other communications protocol.

123. [Previously Presented] An apparatus as claimed in claim 41, wherein the broadband packet network is based on any one or more of the UDP/IP, TCP/IP, IP-MPLS, ATM, Ethernet and DOCSIS protocols, and the data stream is based on any other communications protocol.

If any extension of time under 37 C.F.R. § 1,136 is required to obtain entry of this brief, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,

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